

Applicants have rewritten the claims to refer to the insoluble part or image of the coating as containing a higher concentration of alkaline materials than the soluble part of the coating.

Support is found, for example, on page 6 and pages 9-10 of the specification.

Turning to the art rejections, claim 15 has been rejected as anticipated by Ma et al., while claim 16 has been rejected as obvious from Ma et al. in view of Bratt. Claims 15 and 16 have been cancelled in favor of new claims 26-31. It is submitted that none of the new claims are anticipated by or obvious from the applied art.

Ma et al. teaches that a coating on a substrate of a non-photosensitive layer that contains an acid containing polymer can be made to produce images by applying imagewise an esterifying agent. The coating is initially soluble in aqueous solutions but on esterification of the acid groups, the coating becomes aqueous insoluble. After imaging, treatment of the coating with an aqueous solution removes only the unimaged areas. The Examiner's position that the Ma et al. Patent anticipates now cancelled claim 15 apparently is based on Ma et al.'s disclosure of the use of some esterifying agents that are alkaline. In the preparation of coatings used in the Ma et al. Patent ammonium hydroxide, an alkaline material that is not an esterifying agent, is added to the water/alcohol coating solutions. However, according to Ma et al., on drying the coating by applying heat no change in solubility occurs, thus indicating that alkaline materials by themselves do not insolubilize the coating.

Moreover, Ma et al. requires a heat treatment after applying the alkaline material. In 9 of 10 examples provided by Ma et al. the heat treatment was at 135° C for 5 minutes; the last one had a heat treatment at 135° C for 8 minutes. In the subject Application, the working examples require no heat treatment or heat treatments to at most 120° C for 1 and 2 minutes. Thus,

Applicants' sworn specification demonstrates differences with Ma et al. and the resulting end products.

Moreover, Ma et al. relates only to plates having relief images that by definition have coatings thick enough to physically separate the image area of the plate from the non-image area in a printing process. The present claimed invention relates to plates where chemical immiscibility is used to separate image from non-image.

Bratt has been cited as disclosing the conventionality of an aluminum substrate, and is acknowledged as so teaching. However, beyond that common touchstone, Bratt is quite remote, and clearly does not supply the missing teachings to Ma et al. to achieve or render obvious any of Applicants' claims.

Having dealt with all the objections raised by the Examiner, the Application is believed to be in order for allowance.

In the event there are any fee deficiencies or additional fees are payable, please charge them (or credit any overpayment) to our Deposit Account No. 08-1391.

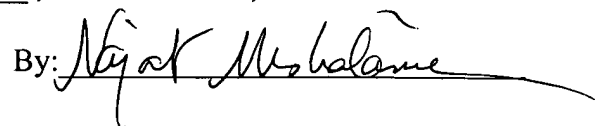
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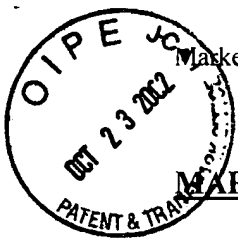


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**MARKED SPECIFICATION PARAGRAPHS SHOWING CHANGES MADE**

**Paragraph bridging pages 6 and 7, beginning at page 6, line 20:**

The present invention provides a process for preparing lithographic plates by ink jet imaging of presensitized plates comprising diazo compounds. According to this inventive process, an alkaline or chemically basic ink comprising one or more suitable pH elevating chemicals is imagewise jetted onto a lithographic plate having a coating comprising diazo compounds. The latent image on the plate is cured by heating, and next developed by washing with a conventional chemical development solution. The plate is then ready to be mounted and used in a conventional lithographic press. Accordingly, there are several objects and advantages of the present invention.

**Paragraph beginning at page 8, line 13:**

After application of the insolubilizing chemical, the plate 6 is preferably heated to between 90 to 130°C for from 15 seconds to 3 minutes, or most preferably to about 120°C for about 2 minutes for the purposes of curing the latent image and to drive the insolubilization reaction to completion. After heating, the plate 6 is developed either by hand or preferably with a conventional developing processor using a conventional developing solution to produce the image 10.

**Paragraph bridging pages 8 and 9, beginning at page 8, line 19:**

FIG 2 depicts a computer-to-plate system comprising an ink jet printer IJP and a conventional developing processor DEVELOPER according to a preferred embodiment of the invention. In the most preferred embodiment, the ink jet printer used is a commercially available drop-on-demand printer capable of printing small ink drops having volumes no larger than 8 picoliters (8 pl) such as the EPSON [Stylus Color] STYLUS COLOR 3000 ink jet printer

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available from Epson America, Inc., Long Beach, CA. However, the great flexibility available to the practitioner in formulating an insolubilizing ink according to the invention means that a well-performing jettable solution can be formulated such that the printhead of almost any ink jet printer will be able to form regular drops with good reliability.

**Paragraph beginning at page 10, line 17:**

The insolubilizing ink may contain one or more surfactants or wetting agents to control the surface tension of the ink, enhancing jettability, and to control the spread and penetration of the drop on the coated plate. The surfactants and wetting agents may include [Iconol DA, Iconol NP, Iconol OP, Iconol TDA, Surfonyl TDA, Surfonyl TG-E, Strodex, Cal-Fax, Tergitol TMN, Tergitol X, Tergitol 15-S] ICONOL DA, ICONOL NP, ICONOL OP, ICONOL TDA, SURFONYL TDA, SURFONYL TG-E, STRODEX, CAL-FAX, TERGITOL TMN, TERGITOL X, TERGITOL 15-S, IPA, Iso-butanol, and similar chemicals or mixtures of similar chemicals. When used, surfactants and wetting agents typically comprise 0.001 to 10 percent of the ink.

**Paragraph beginning at page 11, line 1:**

The insolubilizing ink may also contain one or more biocides to prolong the shelf life of the ink. Suitable biocides include for example GXL, [Phenonip] PHENONIP, DXN, [Sodium Omadine, Kathon PFM, CanGuard 409, Sumquat 6020] SODIUM OMADINE, KATHON PFM, CANGUARD 409, SUMQUAT 6020, and similar chemicals or mixtures of such chemicals. When used, the biocide would typically comprise 0.1 to 3 percent of the ink.

**Paragraph beginning at page 11, line 12:**

To facilitate accurate imaging of the plate, the paper-handling or substrate-handling subsystem of ink jet printer should have a short, straight paper path. A printing plate is generally

stiffer and heavier than the paper or media typically used in commercially available ink jet printers. If the plate fed into the printer mechanism must bend before or after being presented to the imaging printhead, then the movement of the plate through the printer may not be as accurate as the media for which the printer was designed. The most preferred EPSON [Stylus Color] STYLUS COLOR 3000 has such a short, straight paper path. A platen is preferably placed at the entrance to the paper feed mechanism. The platen supports the plate as it is pulled into the printer by the mechanism, facilitating the accurate transport of the plate under the imaging printhead.

**Paragraph beginning at page 13, line 1:**

The resulting coating weight of diazo resins on a subtractive-coated plate is commonly in the range of 5 to 60% of the total dry coating weight. Subtractive coatings may optionally include other chemicals such as colorants, indicator dyes, surfactants, wetting agents, and plasticizers. Suitable colorants may include methylene blue, triphenylmethane dyes, copper phthalocyanines, halogenated copper [phthalocyanines] phthalocyanines, [Rhodamine, Calcozine,] rhodamine, calcozine, Victoria Blue, methyl violet, dioxazine, pigments such as those based on anthraquinone, and mixtures of any of these or like chemicals. When used, colorants are commonly present in the amount of from 1 to 35% of the coating weight.

**Paragraph bridging pages 13 and 14, beginning at page 13, line 9:**

Colorants are generally added to the coating for the purpose of enhancing the visibility of the latent and developed image on the plate. Such colorants do not substantially interfere with or absorb the light used to expose the plate when imaging as this would reduce the plate sensitivity and require that the exposure time be longer or that the light source be more powerful to maintain the same time of exposure. But according to the invention, it may be advantageous to deliberately include one or more dyes or pigments to reduce the light sensitivity of the plate.

Because the invention does not depend on or require a light exposure imaging step, it may be advantageous to reduce or even eliminate the light sensitivity of the plate. Without being bound by theory, carefully selected colorants included in one or more layers of the coating may partially or wholly block the absorption of the imaging light by the diazo functional groups. This would be advantageous in that the press operator or printing artisan could handle the undeveloped plate in any ambient lighting condition without concern of unintended imaging or exposure. Colorants that may be useful for this purpose include but are not limited to Basic Yellow 1 - CI 490, Basic Yellow 2 - CI 41000, Acid Yellow 9 - CI 13015, Acid Yellow 11 - CI 18820, and [Bonjet CW-1] BONJET CW-1, an aqueous dispersion of carbon black available from Orient Chemical Co.

**Paragraph beginning at page 14, line 3:**

Indicator dyes may be used to indicate the imaged areas of the coating after light exposure or chemical imaging according to the invention. Chemicals which may be useful for this purpose include 4-phenylazodiphenylamine, easin, azobenzene, [Calcozine] CALCOZINE, Fuchsine dyes, Crystal Violet dyes, Methylene Blue dyes, and mixtures of these and similar chemicals. When used, indicator dyes are commonly present in amounts of from 0.01 to 0.35%.

**Paragraph beginning at page 16, line 2:**

In a third experiment, a test solution of 75% water and 25% isopropyl alcohol was prepared. To this solution was added 1% by weight sodium carbonate. Drops of this solution were applied to a commercially available plate presensitized with a solvent-borne diazo resin coating ([Lastra] LASTRA Presensitized Plate from Lastra of Sulmona, Italy). Drops of test solutions D, F, and 0 from EXAMPLE 1 were also applied to the solvent-borne coated plate. On visual examination of the plate after application of the drops, it appeared that while the isopropyl-containing test solution drops were absorbed by the plate, the drops of test solutions D,

F, and G sat on top of the plate coating unabsorbed. The plate was placed in an oven at 120°C for 1 minute and developed using DEV ([Lastra] LASTRA). An image was produced corresponding to the drops of the isopropyl-containing test solution, but no images were produced corresponding to the drops of the other test solutions. Without being bound by theory, it is believed that the lack of any co-solvent in the test solutions D, F, and G prevented these solutions from penetrating the solvent-borne coating and thus prevented the chemicals in solution from reacting with the diazo functional groups and insolubilizing the coating at the locations of the corresponding drops.

**Paragraph bridging pages 16 and 17, beginning at page 16, line 18:**

In a fourth experiment, five aqueous diazo coating solutions were made. The first diazo resin used, Diazo Resin A, is commercially available under the name [Diazon 7] DIAZON 7 from Molecular Rearrangement Inc. of Newton, NJ (MRI). By the condensation of 4-diazodiphenylaminebisulfate (commercially available under the name [Diazo S] DIAZO S from MRI) with p-formaldehyde according to the procedures in US Pat No. 5,688,627 (Deutsch), the high (EXAMPLE 8 therein) and low (EXAMPLE 4 therein) molecular weight resins were made respectively named Diazo Resins B and C. Similarly, by the condensation of 3-methoxy-4-diazodiphenylamine bisulfate from MRI with p-formaldehyde Diazo D was made. Diazo E was made by the reaction of 3-methoxy-4-diazodiphenylamine with 4,4'-bismethoxymethyldiphenyl-ether both from MRI.

**Paragraph beginning at page 17, line 6:**

A master batch of coating solution was prepared by mixing the following ingredients:

Vinyl acetate-ethylene copolymer aqueous resin dispersion (55% solids)	12.5g
(Commercially available as [Airflex] <u>AIRFLEX</u> 400 from Air Products, Allentown, PA)	



water	77.0g
propylene glycol	2.5g
copper phthalocyanine aqueous dispersion (Commercially available as [Liquiflex] <u>LIQUIFLEX</u> BR-2025 from Drew Graphics)	2.9g
nonionic surfactant, 5% solution (Commercially available as [Tegowet] <u>TEGOWET</u> 260 from Goldschmidt Chemicals)	0.02g

This master batch of coating solution was divided into five equal parts. To each part was added 0.2g of an above-described diazo resin, A through E successively. Each dispersion was stirred and, using a #4 wire wound rod, coated onto a grained anodized silicated aluminum plate. The coatings were dried with hot air.

**Paragraph beginning at page 18, line 11:**

In a fifth experiment, a double layer coated plate was prepared from aqueous coating solutions. The first layer is an aqueous-borne diazo-sensitized coating enabling the plate to be imaged. The coating solution is prepared by mixing the following ingredients:

Diazo Resin C (from Example 4)	0.34g
Water	34.00g
[Tegowet] <u>TEGOWET</u> 260	0.8g

This solution was coated onto a grained anodized silicated aluminum plate using a #4 wire wound rod and dried with hot air.

**Paragraph bridging pages 18 and 19, beginning at page 18, line 21:**

The coating solution for the protective second layer was prepared by mixing the following ingredients:

Vinyl acetate-acrylic copolymer aqueous resin dispersion, 55% solids (Available commercially as [Gelva] <u>GELVA</u> TS-100 from Solutia, Springfield, MA)	5g
water	27g

[Liquaflex] LIQUAFLEX BR-2025  
[Tegowet] TEGOWET 260

1.15g  
0.04g

The solution was then coated onto the above-described plate having the aqueous-borne diazo coating and dried. Drops of test solutions A, D, F, and G from EXAMPLE 1 above were applied, and then the plate was heated and developed with SD-100. On visual observation, 19 test solutions D and F produced excellent images; solution A produced a fair image; and G produced no image.

**Paragraph beginning at page 19, line 14:**

A third double layer coated plate was tested. A plate was prepared with the same first layer coating as described in EXAMPLE 5, an aqueous-borne sensitizing diazo resin. The second layer coating solution was prepared from:

[Butvar] <u>BUTVAR</u> B-76	2.5g
(polyvinyl butyral resin from Solutia, Springfield, MA)	
[Benzopurpurin] <u>BENZOPURPURIN</u> 4B	.050g
(from Aldrich, Milwaukee, WI)	
ethanol	30ml

After coating and drying, the plate was treated with drops of test solutions D and F from EXAMPLE 1, heated, and developed with SD-100. Excellent images were produced by both test solutions.

**Paragraph beginning at page 20, line 1:**

Two plates with single layer solvent-borne coatings were prepared and tested. A solvent soluble diazo resin (Diazo F) was prepared by reacting Diazo B (from EXAMPLE 4) with 2-hydroxy-4-methoxybenzophenone-5-sulfonic acid. The first plate was coated with the following mixture:

propylene carbonate	15g
ethanol	11g
[Epon] <u>EPON</u> 1031	2g
(a multifunctional epichlorohydrin/tetraphenol	
ethane epoxy resin from Shell Chemicals,	
[Alanta] <u>Atlanta</u> , GA)	
Diazo F	0.9g
[Benzopurpurin] <u>BENZOPURPURIN</u> 4B	0.115g

The second plate was coated with the following mixture:

Ethanol	12g
Propylene carbonate	6g
Diazo F	0.5g
[Epon] <u>EPON</u> 1031	1.13g
[Vinac] <u>VINAC</u> B-15	0.5g
(a polyvinyl acetate resin from McGean,	
Cleveland, OH)	
[Benzopurpurin] <u>BENZOPURPURIN</u> 4B	0.133g